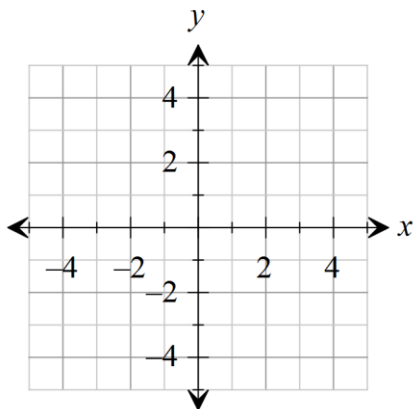
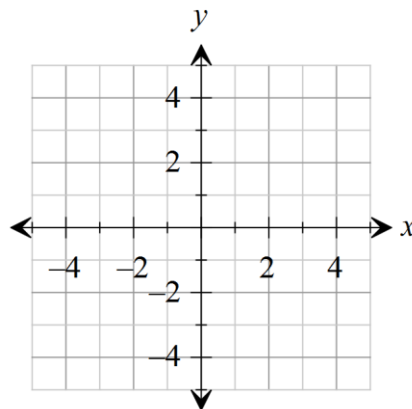


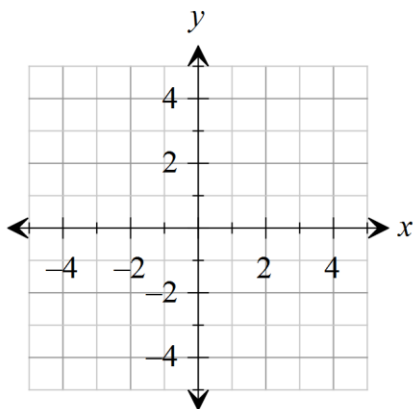
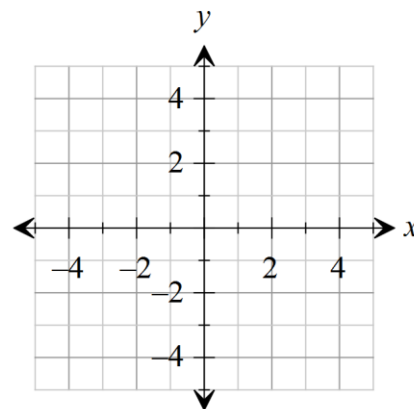
Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

Graph the rectangular coordinates. Find polar coordinates for each given point using radian measure for the angle, whenever possible.

1.  $(3, 3)$ 2.  $(0, 3)$ 

Polar coordinates \_\_\_\_\_

Polar coordinates \_\_\_\_\_

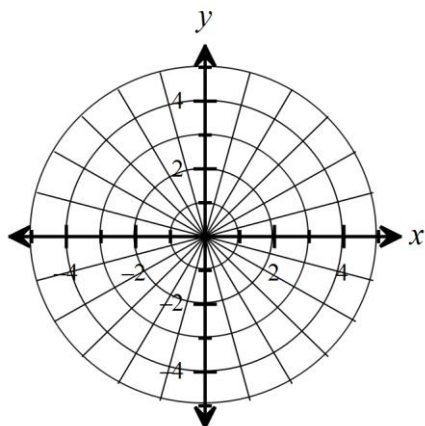
3.  $(-4, -2)$ 4.  $(-2, 0)$ 

Polar coordinates \_\_\_\_\_

Polar coordinates \_\_\_\_\_

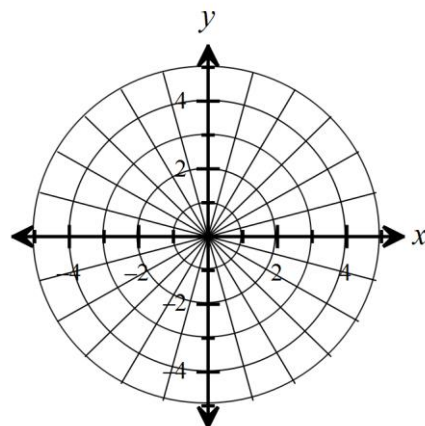
**Graph polar coordinates. Find rectangular coordinates for each given point.**

5.  $\left(3, \frac{\pi}{2}\right)$



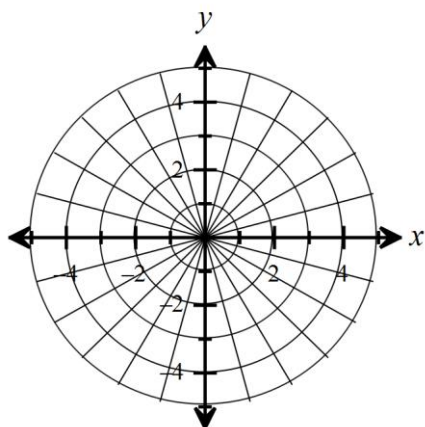
Rectangular coordinates \_\_\_\_\_

6.  $(2, \pi)$



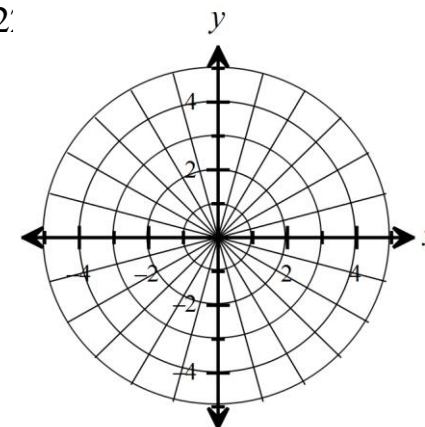
Rectangular coordinates \_\_\_\_\_

7.  $\left(2, -\frac{\pi}{4}\right)$



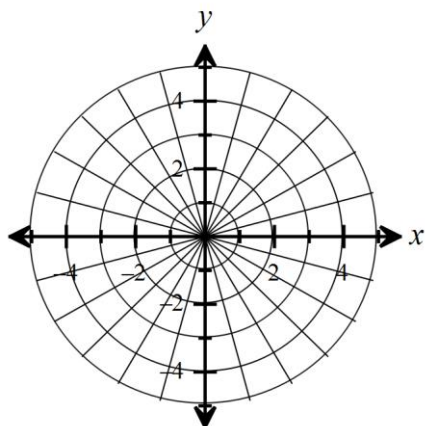
Rectangular coordinates \_\_\_\_\_

8.  $(3, -2\pi)$



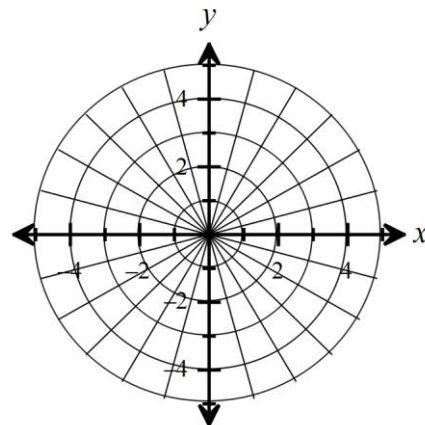
Rectangular coordinates \_\_\_\_\_

9.  $\left(-2, \frac{2\pi}{3}\right)$



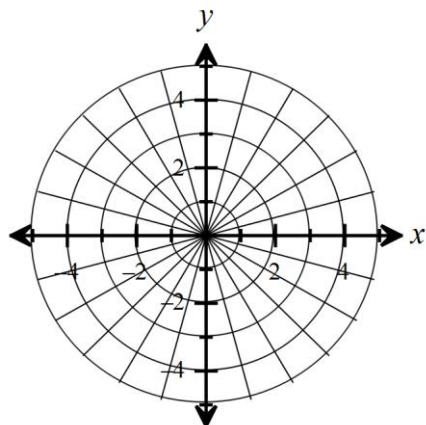
Rectangular coordinates \_\_\_\_\_

10.  $\left(-4, -\frac{5\pi}{6}\right)$

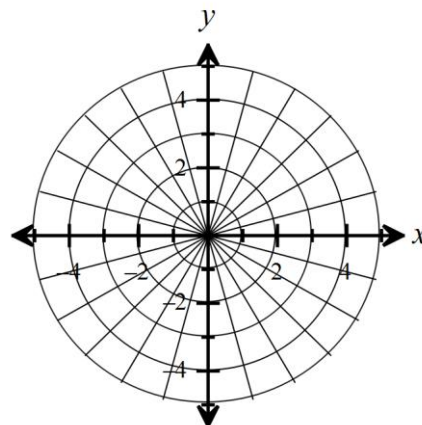


Rectangular coordinates \_\_\_\_\_

11.  $\left(-1, -\frac{4\pi}{3}\right)$



12.  $\left(-4, \frac{\pi}{6}\right)$



Rectangular coordinates \_\_\_\_\_

Rectangular coordinates \_\_\_\_\_

**Convert the polar coordinates of each point to rectangular coordinates.**

13.  $\left(1, \frac{\pi}{6}\right)$

14.  $\left(-3, \frac{3\pi}{2}\right)$

15.  $\left(\sqrt{2}, 135^\circ\right)$

16.  $\left(\frac{-\sqrt{2}}{2}, -45^\circ\right)$

**Convert the rectangular coordinates of each point to polar coordinates. Use degrees for  $\Theta$ . Round to the nearest tenth if needed.**

17.  $(-2, 2)$

18.  $(-2, 2\sqrt{3})$

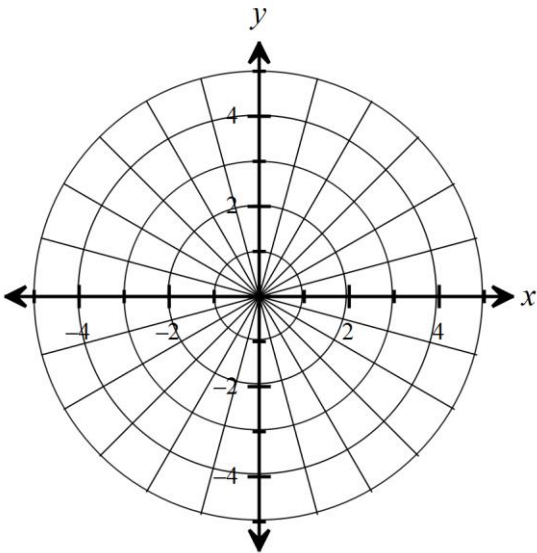
19.  $(0, 2)$

20.  $(1, 4)$

Complete the table for the following polar equations. Graph the points.

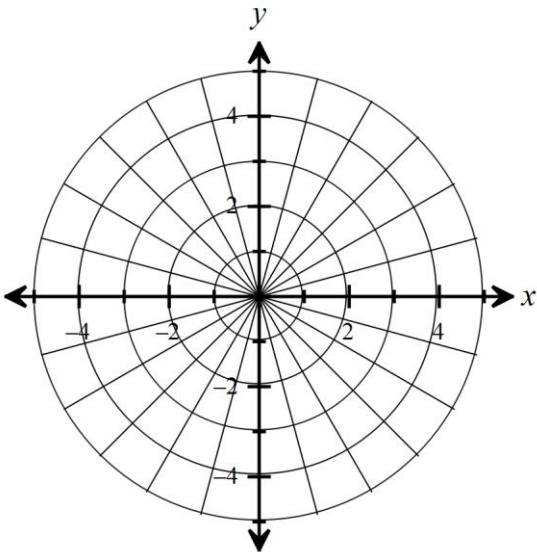
21.  $r = 3 \sin \theta$

$\theta$	$r$
0	
$\frac{\pi}{4}$	
$\frac{\pi}{2}$	
$\frac{3\pi}{4}$	
$\pi$	
$\frac{5\pi}{4}$	
$\frac{3\pi}{2}$	
$\frac{7\pi}{4}$	
$2\pi$	



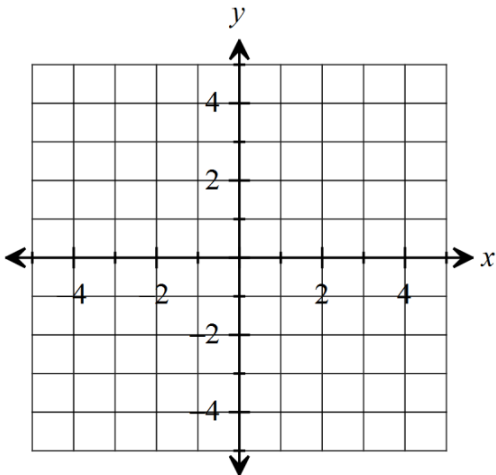
22.  $r = 2 \cos 2\theta$

$\theta$	$r$
0	
$\frac{\pi}{4}$	
$\frac{\pi}{2}$	
$\frac{3\pi}{4}$	
$\pi$	
$\frac{5\pi}{4}$	
$\frac{3\pi}{2}$	
$\frac{7\pi}{4}$	
$2\pi$	

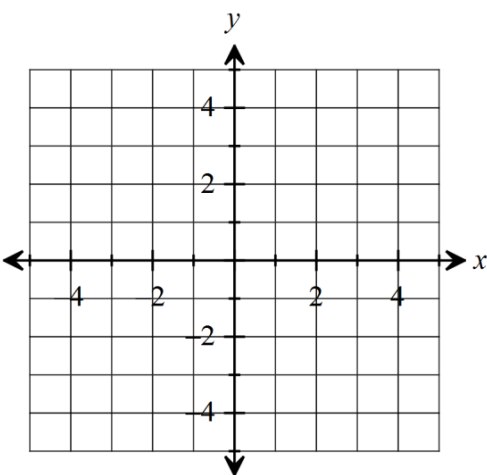


Use your calculator to graph each polar equation. Then sketch the graph of each polar equation.

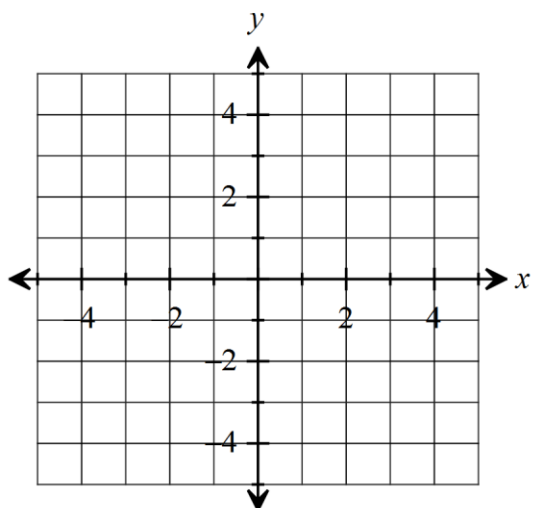
23.  $r = 2 \sin \theta$



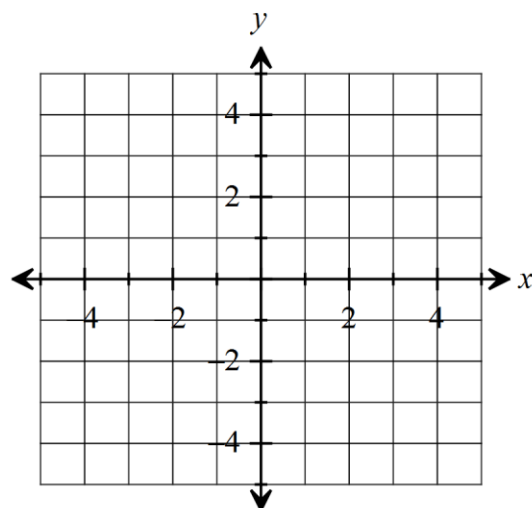
24.  $r = 3 \cos 2\theta$



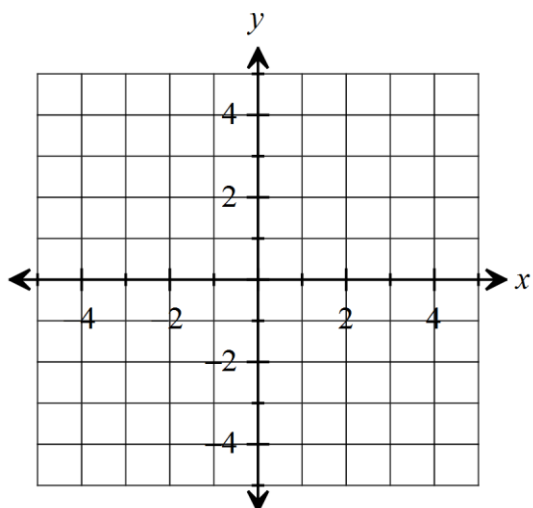
25.  $r = 1 + \cos \theta$  (cardioid)



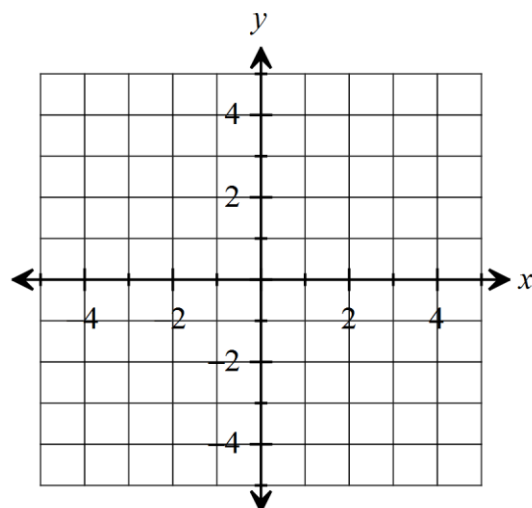
26.  $r^2 = 9 \cos 2\theta$  (lemniscate)



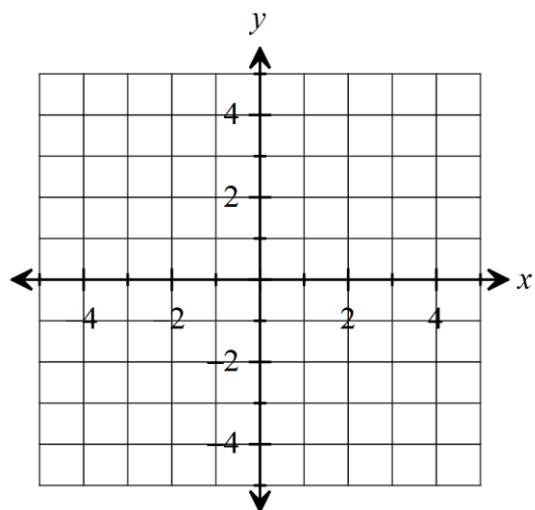
27.  $r = 4 \cos 2\theta$  (four-leaf rose)



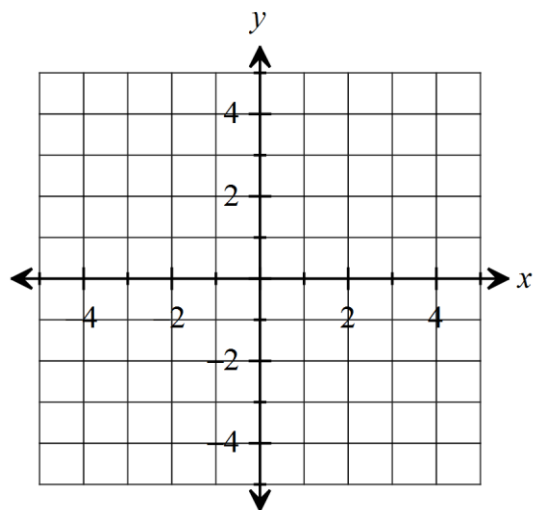
28.  $r = 2 \sin 3\theta$  (three-leaf rose)



29.  $r = 1 + 2 \cos \theta$  (limaçon)



30.  $r = 3.5$



**For each polar equation, write an equivalent rectangular equation.**

31.  $r = 4\cos\theta$

32.  $r = 5$

33.  $\theta = \frac{\pi}{4}$

**For each rectangular equation, write an equivalent polar equation.**

34.  $x = 4$

35.  $y = -6$

36.  $x^2 + y^2 = 4$

**For each polar equation, write an equivalent rectangular equation.**

37.  $r = -2\sin\theta$

38.  $r = -2$

39.  $r = 6\cos\theta$

**For each rectangular equation, write an equivalent polar equation.**

40.  $x^2 + y^2 = 25$

41.  $x = -2$

42.  $y = 3$

## **Review**

**Perform the indicated operations.**

43.  $(4 + 3i)^2$

44.  $\frac{2+i}{4-i}$

45.  $(-3 + 5i) - (-4 - 2i)$

46. The force required to push a riding lawnmower up a ramp inclined at 12 degrees is 130 pounds. Find the weight of the riding lawnmower to the nearest pound.